

REMARKS

Claims 1-19 are pending. By this Amendment, the specification including the abstract, is amended and claims 1, 3-6, 9-11, 13-16 and 19 are amended. Reconsideration in view of the above amendments and following remarks is respectfully requested.

The abstract was objected to. The abstract has been amended in accordance with the suggestion of the Office Action. Reconsideration and withdrawal of the objection to the abstract are respectfully requested.

Claims 1, 2, 5-8 and 10-18 were rejected under 35 U.S.C. §102(b) over Ueta (U.S. Patent 6,618,120). The rejection is respectfully traversed.

The Examiner alleges on page 2, paragraph number 4, of the Office Action that Ueta discloses a level sensor unit 96 which correspond to the claimed sensor unit configured to determine a distance of at least one location point on the surface of the substrate relative to a reference plane. It is respectfully submitted that the level sensor unit 96 of Ueta does not correspond to the claimed sensor unit. In addition, it is respectfully submitted that Ueta fails to disclose or suggest a calculating unit configured to determine a feed-forward set-point signal based on the stored surface information and a feed-forward set-point signal forwardly fed to the servo unit in order to position the substrate holder.

As disclosed in column 11, lines 63-65, the sensors 96 of Ueta send the resulting tilt position of the wafer table and produce corresponding positional data S_1 , S_2 , S_3 . The sensors 96 do not sense a distance of a corresponding location point on a substrate surface relative to a reference plane, as recited in claim 1.

As further disclosed in column 12, lines 2-5, the sensor data from the sensors 96 are fed back to comparator 91. The positional data is not used to determine a feed-forward set-point signal, as recited in claim 1.

Although Ueta disclose in column 12, lines 18-25, that in the embodiment of Figure 5 the feed-forward loop begins with data output from the comparator 93 that are routed to the fifth transfer matrix 102, as discussed above, the data that is output from the comparator 93 and fed forward is not a set-point signal based on stored surface information. As disclosed in column 11, lines 54-56, the comparator 93 processes a inertia coordinates representing the desired torque coordinates and the desired force in the Z direction, not a feed-forward set-point signal based on stored surface information.

As Ueta does not disclose suggest all of the features of claim 1, Ueta cannot anticipate or render obvious claim 1.

Claims 2 and 5-8 recite additional features of the invention and are allowable for the same reasons discussed above with respect to claim 1 and for the additional features recited therein.

Claim 10 recites a device manufacturing method including the storing of surface information of the substrate based on respective distances of corresponding location points on the substrate surface, calculating a set-point signal based on the stored surface information, and forwarding the set-point signal to a servo unit configured to position the substrate holder.

As discussed above, Ueta does not disclose or suggest surface information of location points on a substrate surface relative to projection system, calculating a set-point signal based on the stored surface information and forwarding the set-point signal to a servo unit. Accordingly, Ueta cannot anticipate or render obvious claim 10.

Claim 11 recites a lithographic substrate focus control system including a calculating unit configured to determine a feed-forward set-point signal based on stored surface information, wherein the feed-forward set-point signal is forwardly fed to a servo unit to position a substrate holder.

Ueta does not disclose or suggest the features of claim 11. As discussed above, Ueta has sensors 96 that provide positional data of the wafer table, not of a location point on a substrate surface relative to a reference plane. Ueta also feeds back the sensor data to a comparator 91. Finally, the comparator 93 of Ueta feeds forward the inertia coordinates output by the comparator 93. The comparator 93 does not feed-forward a set-point signal based on stored surface information.

Claims 11-18 recite additional features of the invention and allowable for the same reasons discussed above with respect to claim 11 and for the additional features recited therein.

Reconsideration and withdrawal of the rejection over Ueta are respectfully requested.

Claims 1-5 and 11-15 were rejected under 35 U.S.C. §102(b) over Matsuyama et al. (U.S. Patent Application Publication 2002/0171815 A1). The rejection is respectfully traversed.

The Examiner alleges on page 3, paragraph number 5, of the Office Action that Matsuyama et al. disclose the features of claims 1-5 and 11-15 in paragraphs [0132, 0154,

0490, and 0510]. It is respectfully submitted that Matsuyama et al. do not disclose or suggest the features recited in claims 1-5 and 11-15 in these paragraphs, or any other paragraphs.

Matsuyama et al. disclose in paragraph [0132] that the tilt of the entire apparatus can be corrected by using feed back or feed forward control in an active manner. However, Matsuyama et al. do not disclose or suggest determining a distance of at least one location point on a surface of a substrate relative to a reference plane, storing surface information based on respective distances of corresponding location points on the substrate surface, calculating a feed-forward set-point signal based on the stored surface information, and forwardly feeding the set-point signal to a servo unit in order to position a substrate holder.

Paragraph [0154] of Matsuyama et al. disclose that the focus leveling sensor of Figure 2 may be as shown in U.S. Patent 5,473,424 (copy enclosed). U.S. Patent 5,473,424 to Okumura disclose a tilting apparatus having a table for holding a substrate and a stage for supporting the table. Three fulcrums support the table and a first detector detects the position of the table in a first plane and a second detector detects a deviation in the direction perpendicular to the first plane. A calculator calculates the residual deviation in the direction perpendicular to the first plane at each of the three fulcrums and a controller controls the amounts of displacement of the three fulcrums on the basis of the calculated residual deviation. There is no disclosure or suggestion by Okumura of the features recited in claims 1-5 and 11-15.

Paragraph [0490] of Matsuyama et al. disclose that a movable mirror 5A is adjusted by an actuator 5B and controlled in a feed back or feed forward manner based on a signal from a detector that detects a position monitoring beam emitted with a pulse from a laser light source 1. However, there is not disclosure or suggestion determining a distance of at least one location point on the surface of a substrate relative to a reference plane, storing surface information, calculating a feed-forward set-point signal based on the stored surface information and forwardly feeding the set-point signal to a servo unit.

Paragraph [0510] of Matsuyama et al. disclose that vibration control tables 47A-47D move the Z direction position of a stage base plate 31D and a support column 31C independent by feed back and feed-forward control to stabilize a position of the main body even if the position of the main body changes in the center of gravity accompanying with the movement of the reticle stage 30 and the wafer stage 42 in response to a signal from a position detecting sensor that monitors positional variation in the main body of the exposure

apparatus relative to the flow. There is no disclosure or suggestion this paragraph of the features recited claims 1-5 and 11-15.

Reconsideration and withdrawal of the rejection over Matsuyama et al. are respectfully requested.

Claims 1-19 were rejected under 35 U.S.C. §102(b) over European Patent Application No. 1 231 513 A1. The rejection is respectfully traversed.

Although the Office Action identifies the reference as “EP1 232 513” is respectfully submitted that the corrected number is 1 231 513.

It is respectfully noted that European Patent Application 1 231 513 A1 is equivalent to U.S. Patent 6,741,331 to Boonman et al., assigned to ASML Netherlands B.V. ASM Lithography B.V., the applicant of EP 1 231 513, changed its name to ASML Netherlands B.V. It is also respectfully noted that the undersigned is the attorney of record in U.S. Patent 6,741,331 to Boonman et al.

EP 1 231 513 discloses a plurality of manipulators 22, 24, 26 that are used to adjust the position of optical elements 21, 23, 25 in the projection system so that the focal plane 11, 12, 13 is adjusted to be in closer conformity to the shape of the wafer surface WS. However, there is disclosure or suggestion of, at least, calculating a feed-forward set-point signal based on stored surface information and forwardly feeding the set-point signal to a servo unit in order to position the substrate holder. Accordingly, EP 1 231 513 cannot anticipate or render obvious claims 1-19.

Reconsideration and withdrawal of the rejection over EP 1 231 513 are respectfully requested.

In view of the above amendments and remarks, Applicants respectfully submit that all the claims are allowable and that the entire application is in condition for allowance.

BUTLER et al. -- 10/779,866
Attorney Docket: 081468-0308313

Should the Examiner believe anything further is desirable to place the application in better condition for allowance, the Examiner is invited to contact undersigned at the telephone number listed below.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP



JOHN P. DARLING

Reg. No. 44482

Tel. No. 703.770.7745

Fax No. 703.770.7901

JPD
P.O. Box 10500
McLean, VA 22102
Tel. No. 703.770.7900

Attachment: U.S. Patent 5,473,424

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